

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE NORTH CAROLINA DEPARTMENT OF AGRICULTURE;
W. A. GRAHAM, COMMISSIONER; B. W. KILGORE, STATE CHEMIST
AND DIRECTOR OF EXPERIMENT STATION;
C. B. WILLIAMS, AGRONOMIST.

SOIL SURVEY OF CALDWELL COUNTY, NORTH CAROLINA.

BY

W. B. COBB, OF THE U. S. DEPARTMENT OF AGRICULTURE,
IN CHARGE, AND S. F. DAVIDSON, OF THE NORTH
CAROLINA DEPARTMENT OF AGRICULTURE.

W. EDWARD HEARN, INSPECTOR, SOUTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1917.]



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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., December 27, 1918.

SIR: I have the honor to transmit herewith the manuscript report and map covering the survey of Caldwell County, North Carolina, and to recommend that they be published as advance sheets of Field Operations of the Bureau of Soils, 1917, as authorized by law.

This work was done in cooperation with the North Carolina Department of Agriculture.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

Hon. D. F. HOUSTON,
Secretary of Agriculture.

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MAP.

Soil map, Caldwell County sheet, North Carolina.

SOIL SURVEY OF CALDWELL COUNTY, NORTH CAROLINA.

By W. B. COBB, of the U. S. Department of Agriculture, In Charge, and S. F. DAVIDSON, of the North Carolina Department of Agriculture.—Area Inspected by W. EDWARD HEARN.

DESCRIPTION OF THE AREA.

Caldwell County is situated in the western part of North Carolina, in the second tier of counties east of the Tennessee State line and in the third tier south of the Virginia State line. The county is irregularly oblong in shape, being about 36 miles in length in a northwest-southeast direction, and about 21 miles in width. Its area is 512 square miles, or 327,680 acres.

The region in which Caldwell County lies consists of two plateaus, a higher and a lower. The higher one occupies the northern part of the region, and the boundary line between this and the lower runs in a northeast and southwest direction. Both plateaus are thoroughly dissected and both have more or less isolated remnants of still higher surfaces standing above their general upland level. The drop from the higher plateau to the lower one is steep but not precipitous. The southeastern edge of the higher plateau is made ragged by a great number of short ravines occupied by small streams that have worked their way back from the lower plateau into the southeastern edge of the higher. The southeastern slope, therefore, of the high plateau consists of a rather intricate series of southeasterly projecting ridges, rapidly decreasing in height, and northwesterly projecting deep ravines. The heads of these steep ravines lie along an approximately smooth but not straight line, so that the smoother part of the high plateau surface lying north of them is sharply limited on the south by this smooth line.

The northern boundary of Caldwell County lies along the smooth line marking the heads of the narrow ravines which have dissected the southeastern edge of the high plateau. The county occupies, therefore, a large area of the low plateau and the ragged southeastern edge of the high plateau. The general level of the western line of the



FIG. 1.—Sketch map showing location of the Caldwell County area, North Carolina.

county is about 2,000 feet, but the extreme northwestern corner lies on the top of one of the isolated remnants referred to above, which stands on the upland surface of the high plateau. This is Grandfather Mountain, whose summit reaches 5,964 feet above sea level. The southern edge of the smooth portion of the high plateau, along which the county boundary runs, is known as the Blue Ridge, and the plateau itself, which extends westward from this, is known as the Blue Ridge Plateau or the Mountains of Western North Carolina. The northwestern part of the county covering the ragged eastern edge of the high plateau is not more than 10 miles wide, so that the greater part of the county lies within the lower plateau, which is designated in this region as the Piedmont Plateau. It consists of two lowland belts with an intermediate highland belt. The southeastern part of the county occupies one of these lowland belts; the south-central part a highland belt not so high, however, as the high plateau in the northwestern part of the county; and the northern part a rather narrow lowland belt which lies immediately southeast of the foot of the ragged edge of the high plateau. The general level of the lowland of the southern part of the county is about 1,000 feet above sea level. That of the highland, occupying a belt between the two lowland stretches, varies considerably, ranging from 1,200 to 1,500 feet in elevation. The two lowland belts have a general upland surface that would be level were they not dissected by a great number of valleys. The dissection, however, is not deep nor are the slopes steep, so that the resultant surface is a rolling one with rather rounded valley slopes. The intermediate upland consists of a series of low ridges and isolated hills. The ridges have a distinct northeast trend parallel to the direction of the physical features of the region as a whole. They are rather steep sided. The isolated hills are small and rather rough, so that as a whole the belt is much rougher than the two belts just described, but not so rough as the ragged southeastern portion of the high plateau.

From the southern line of the county, therefore, northward we have, in succession, a smooth upland thoroughly but not sharply dissected, a highland belt which is rather rough and which trends in a northeast and southwest direction, a lower upland belt similar to the one along the southern part of the county, and, finally, in the extreme northwestern part of the county a rough belt which consists of the ragged edge of the high plateau.

The largest stream flowing across the county, the Yadkin River, has a northeastward course parallel to the trend of the major physical features. The Catawba along the southern boundary has an eastward course, but nearer its head its course is likewise northeastward. The larger secondary streams in the Piedmont portion of the county have a

northeastward or southwestward course, parallel to the trend of the physical features, but from these main streams the minor drainage ramifies in all directions and to all parts of the county.

The drainage of the county is very well established, practically every farm being reached by at least one branch. Springs of good water are found on nearly every farm. The streams carry a good volume of water and have swift currents. Water power is used to run a number of cotton mills and factories, and a large number of flour and grist mills are scattered throughout the county. Several projects for the further development of the water power are being worked out.

Caldwell County was formed by an act of the State Legislature in 1841 from parts of Burke and Wilkes Counties. Since that time part of the western end of the county has been attached to Avery County. The early settlers in this region were mostly of Scotch-Irish and Pennsylvania Dutch descent. The population at present is largely concentrated around the towns and mill centers. The rural population is scattered pretty evenly over the Piedmont section, but is confined chiefly to the valleys in the mountain sections.

According to the 1910 census, the total population of the county is 17,215, 83.7 per cent of which is classed as rural. The population in 1910 averaged 33.6 persons per square mile. Lenoir, the county seat, with a population of 3,364 in 1910, is the principal town. The second largest town at present is Granite Falls, although in 1910 Hudson had the larger population, the former having a population of 381 and the latter 411. Other locally important towns are Rhodhiss, which had a population of 370 in 1910; Mortimer, 261; Kings Creek, 100; Patterson, 86; and Collettsville, 80.

The transportation facilities of part of the county are good. The Carolina & Northwestern Railroad enters the county southeast of Rhodhiss, passing through that town, Granite Falls, Hudson, Whithel, Lenoir, Collettsville, Adako, and Mortimer, with Edgemont as its terminus. Grandin is the terminus of a branch of the Watauga & Yadkin River Railroad.

The country roads of Caldwell County are only fair for the most part, although there are very good roads throughout the southeastern part of the county. The Hickory, Lenoir, and Blowing Rock Highway, which traverses the county north and south, is a good automobile road. The telephone service throughout the Piedmont and Valley sections of the county is good, but throughout the greater part of the mountainous portion of the county telephone service is lacking.

The principal markets for agricultural products are Lenoir and the larger towns of the county. Hickory is the principal market outside the county.

CLIMATE.

The climate of Caldwell County is very favorable for agriculture. The average annual rainfall as recorded at Lenoir is 50.48 inches. The rainfall varies little from year to year, and crops very seldom suffer from either drought or excessive rains. The rainfall for 1904, the driest year recorded, was 41.39 inches, and even in that year the rainfall during the growing season was as heavy as normal. In 1886, the wettest year on record, it was 64 inches. The rainfall is distributed quite uniformly throughout the year, though slightly greater during the growing season than during the winter months.

The temperatures are comparatively mild. The mean for June, July, and August is 73.4° F. The summers in the mountain sections of the county are somewhat cooler than is shown by the records for Lenoir. The maximum temperature recorded is 100° F., which occurred in June. The average temperature for the spring months as recorded at Lenoir is 57° and for the fall months, 56.4° F. The winters are generally mild, although there are occasionally very severe winters. The lowest temperature recorded is -16° F. in December. The snowfall is generally rather light, although there are occasional winters of comparatively heavy snowfall.

The average length of the growing season as recorded at Lenoir is 184 days. The average date of the last killing frost in the spring is April 18, and that of the first in the fall, October 18. Killing frosts have been recorded, however, as late in the spring as May 15, and as early in the fall as October 1. The growing season is somewhat shorter in the more mountainous districts of the county than at Lenoir. The grazing season lasts about nine months.

The following table gives the normal monthly, seasonal, and annual temperature and precipitation as compiled from the records of the weather bureau station at Lenoir:

Normal monthly, seasonal, and annual temperature and precipitation at Lenoir.

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1904).	Total amount for the wettest year (1886).
	° F.	° F.	° F.	Inches.	Inches.	Inches.
December.....	38.6	76	-16	3.51	4.29	4.70
January.....	36.9	77	-15	4.01	1.61	7.40
February.....	41.0	75	- 8	4.29	2.60	1.90
Winter.....	38.8	77	-16	11.81	8.41	14.00

Normal monthly, seasonal, and annual temperature, etc.—Continued.

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1904).	Total amount for the wettest year (1886).
	° F.	° F.	° F.	Inches.	Inches.	Inches.
March.....	46.4	86	8	4.36	4.20	3.40
April.....	59.8	92	19	3.56	1.31	3.50
May.....	64.8	96	30	4.61	5.11	6.20
Spring.....	57.0	96	8	12.53	10.62	13.10
June.....	71.5	100	37	4.23	3.74	8.00
July.....	75.0	98	46	4.95	6.40	9.10
August.....	73.7	99	47	5.97	7.12	10.20
Summer.....	73.4	100	37	15.15	17.26	27.30
September.....	66.7	94	32	4.58	1.90	2.70
October.....	56.5	95	19	3.32	T.	1.00
November.....	46.0	83	12	3.09	3.20	5.90
Fall.....	56.4	95	12	10.99	5.10	9.60
Year.....	56.4	100	-16	50.48	41.39	64.00

AGRICULTURE.

The most extensive agricultural development in Caldwell County before the Civil War was in "Happy Valley" along the Yadkin River, along Lower Creek, and on Johns River and Mulberry Creek. Many of the farmers in these valleys operated plantations on a fairly extensive scale. The farm products of to-day differ very little from those of the ante-bellum period. The principal crops were corn, wheat, oats, rye, flax, buckwheat, and vegetables, grown principally for use on the farms. The early live stock of the county consisted of horses, cattle, hogs, sheep, and poultry. Some wool was spun at home. The early settlers in the mountain and Piedmont uplands subsisted partly by hunting and fishing and partly by growing small patches of grain and vegetables. They also raised some live stock to furnish meat for home consumption.

By 1879 there were 1,442 farms in the county, with an average of 33 acres of improved land per farm. Corn, which occupied a total of 17,315 acres, was the most important crop, followed by wheat, oats, hay, rye, and sweet potatoes in the order named. Sorghum was an important crop at this time. The acreage of this crop was not given in the 1880 census, but a production of 27,518 gallons of sirup is recorded. A total of 75 acres of tobacco, 35 acres of buckwheat, and 30 acres of cotton was grown in 1879. During the next

decade the acreage of all crops except rye and buckwheat increased to some extent, and Irish potatoes became an important crop. In 1899 the acreage of oats had fallen off, while that of corn, wheat, hay crops, Irish potatoes, and sweet potatoes had increased somewhat. Cowpeas and beans were becoming important crops. The value of the live stock, dairy, and poultry products sold in 1899 amounted to \$182,228.

The agriculture of Caldwell County at the present time consists mainly of the production of corn, wheat, oats, cowpeas, and cotton. Very little cotton is grown, but it is, nevertheless, a money crop, the cereals being used principally for home consumption. The farmers, however, derive some revenue from the sale of grains and from lumber, crossties, and tanbark. In many sections of the county sufficient grain and hay is not produced to feed the work stock, and large quantities are shipped into the county. There is no reason why Caldwell County should not grow these crops in abundance and be able to export them.

In 1910 there were 2,548 farms in the county, with an average of 29.3 acres of improved land per farm. Corn was the most extensively grown crop, occupying 23,829 acres. The present acreage is considerably larger than that in 1910. The estimated average yield of corn for the county is between 15 and 18 bushels. The bottom lands and the better mountain soils average about 25 bushels per acre, while the other uplands average from 10 to 13 bushels. Corn is used chiefly as a subsistence crop, although many of the farmers grow some for sale. The principal varieties are Goodmans Prolific, Hickory King, Lippards, and Boone County White.

Wheat is the second most important crop. It is largely a subsistence crop, although part of the crop is sold, mainly to the Lenoir Roller Mills. The estimated present area in wheat is 12,000 acres, and the estimated average yield 9 bushels per acre. Bearded wheat is generally sown in the bottom lands and smooth wheat on the uplands.

Soy beans have become an important crop, occupying a present estimated area of 6,000 acres. The crop is mostly planted in corn fields, but it is occasionally grown by itself, producing an average of about 15 bushels per acre.

Cowpeas are an important crop, with a present estimated area of about 5,000 acres. Cowpeas are grown both in corn and separately, giving an average yield of about 8 bushels of seed and 1 ton of hay per acre.

About 1,000 acres are planted to Irish potatoes, the yield ranging from 40 or 50 to 150 bushels per acre, and averaging about 70 bushels. The sweet potato acreage is probably a little less than that of Irish

potatoes. The yields are higher, however, averaging about 105 bushels per acre. Part of the sweet potato crop is shipped out of the county, most of it going to neighboring counties across the Blue Ridge.

Rye is another important subsistence crop, occupying a total area of about 4,000 acres. About half the area in rye is grazed down and plowed under. The average yield of that part of the crop which is allowed to mature is about 10 bushels per acre. Abruzzi rye is being introduced, with good results.

About 3,000 acres are devoted to sorghum, the yields averaging about 60 gallons of sirup per acre. The varieties most extensively grown are Orange Sugar Drip and Amber. Few large fields of sorghum are grown, but nearly every farmer grows enough sorghum to produce sirup for home use.

About 5,000 acres are used for the production of tame hay, with an average yield of 1 ton or a little more per acre. The principal varieties of grasses are orchard grass, redtop, rye grass, timothy, red clover, and tall meadow oat grass. About 1,700 acres of grain, chiefly oats, are cut for hay every year. The feeding practice known as soiling is carried on by practically every farmer. It consists of reserving a few acres of grain or other hay crops which are cut a little at a time for feeding purposes before the principal meadow and grain crops are harvested. Coarse forage, which consists chiefly of sorghum, corn, and cowpeas, is grown on a total of about 1,500 acres, and the average yield is about $1\frac{1}{2}$ tons per acre.

The area devoted to oats amounts to about 2,500 acres, and the average yield is about 18 bushels per acre. The principal varieties grown are White Turf, Ninety-Day, Red Rust-Proof, Winter Appler, and Black Spring.

The only exclusively cash crops are cotton and tobacco, but these are not grown at all extensively and are confined to the southeastern part of the county. About 400 acres of cotton were planted in 1917, and the average yield is from one-third to one-half bale per acre. About 100 acres of tobacco were planted in 1917. The average yield of this crop approximates 700 pounds per acre. Watermelons and cantaloupes are grown to some extent in the southern part of the county. Many farmers grow a surplus of these crops and haul wagonloads to the towns and into the mountain districts for sale and to exchange for other products.

Buckwheat, peanuts, beans, cabbage, onions, and other vegetables are grown in small areas on many farms, principally for home use, but to some extent for sale on the local markets.

There are about 200,000 apple trees in the county. The most extensively grown varieties of apples are Limbertwig, Dula Beauty,

Virginia Beauty, Winesap, Grimes Golden, and Golden Russet. There are about 40,000 peach trees in the county and about 8,000 grapevines.

The combined value of all animals sold or slaughtered in 1909 and of all live-stock products produced in that year amounted to \$333,247. The number of cattle sold or slaughtered was 2,977, the number of horses and mules sold was 340, the number of hogs sold or slaughtered was 6,495, and the number of sheep and goats 87. According to the estimates of the Bureau of Crop Estimates, in 1916 there were 1,451 horses, 1,518 mules, 6,960 head of cattle, 4,835 hogs, and 206 sheep in Caldwell County.

The cattle are scattered pretty evenly throughout the county, while hogs are most extensively raised in the Piedmont and valley sections. Most of the live stock is butchered on the farm or sold on local markets, although several carloads are shipped out of the county every year. Dairying is carried on chiefly to supply local markets, but there are three cream routes into Hickory which are partly in Caldwell County.

The topography and character of the soil do not materially influence the kind of crops grown from place to place. The farmers have found, however, that a certain strain of wheat may be best adapted to the upland, while another does best on the bottom land. Of the upland soils, the Cecil and Porters clay loams and the Louisa loam are best adapted to wheat, while the Porters and Ashe loams are better adapted to corn. Cotton and tobacco do best on the Louisa loam and the Cecil sandy loam. These crop adaptations are recognized by the farmers.

The rotation most extensively practiced consists of corn one year, with cowpeas or soy beans, followed by wheat. Cowpeas are generally sown broadcast between the rows, while soy beans are either planted between the hills in the row or in alternate rows with the corn.

The farm equipment of the county is considerably varied. The better located, more progressive farmers have good, roomy houses and outbuildings, but there are a good many one-roomed cabins in some of the mountain districts. There are three or four silos in the county.

The most extensively used implements are one and two horse turning plows, disk harrows, drag harrows, and double-shovel plows. Hillside plows are used on the steeper slopes in the mountains, except in a few cases where the land is too steep to be cultivated except by hand. Drills are generally used for seeding small grains. There are quite a number of wheat binders in the county, and five or six corn binders. A few thrashing machines and shredders are in use, and at least one power tractor. In the less steep parts of the county

crops are hauled from the fields in wagons, while sleds are used in the more mountainous sections.

The total amount spent for fertilizers in 1909 was \$25,163. The most extensively used fertilizer is acid phosphate, which is applied at the rate of about 150 pounds per acre. Cottonseed meal is frequently used with this, the rate of application in this case being about one bag of each per acre, or 200 pounds of acid phosphate to 100 pounds of meal. The same fertilizers are used on the different grain crops. Stable manure is used principally in garden patches, but also on general farm crops when it is available.

The farm labor is done mainly by the farmer and members of his family. Hired labor is generally paid \$1 a day, with board.

The farms in Caldwell County vary in size from 40 to 200 or 300 acres. The average size in 1910 was 85.7 acres. About 76 per cent of the farms are operated by the owners. The rest are operated mainly by tenants on the share system. Under the prevailing share system on upland soils the landlord furnishes one-third of the fertilizer and receives one-third of the crop. On the bottom lands the landlord gets one-half of the corn and one-third of the wheat, and shares in the cost of fertilizer in the same ratio. When the landlord furnishes everything except the labor and seed he receives two-thirds of the crop.

The average price of good farming land is about \$40 an acre. The average price of all land in the county would be considerably less, probably about \$25 an acre. The full range in price is from \$2 to \$125 an acre, depending upon whether the land is unimproved, rough and mountainous, or highly developed. Well-located bottom lands bring the highest prices.

The mountainous portion of the county offers splendid opportunity for the growing of apples and the raising of cattle and sheep.

SOILS.

Caldwell County is located in the Piedmont and Appalachian soil provinces. The Piedmont covers the southern part of the county. The boundary between these provinces is in places rather indistinct and irregular, but it extends in an approximate east and west line from Bald Knob to near Muttenez. Small detached areas of Piedmont soils occur between Brushy and Little Brushy Mountains, north of the Brushy Ridges along Beaver Creek, along the upper branches of Lower Creek, and along the Yadkin River and its tributary, King Creek. The remainder of the county is made up of soils of the Appalachian province, except for comparatively narrow strips of alluvial soil along most of the streams.

The Piedmont soils are derived mainly from granite, gneiss, and schist. The soils of the Cecil series come largely from the weather-

ing of the underlying granite and gneiss formation, while those of the Louisa series are derived from a kind of crystalline schist formation, or "red rock," as it is called locally. This formation seems to overlie the granite and gneiss from which the Cecil soils are derived. Small areas of basic igneous rocks, principally diorite and diabase, occur in this section of the county.

The greater part of the soils of the eastern half of the mountain section of the county are derived from the rock formation known as the Carolina gneiss. This formation also includes schist in some places. Soils of the Ashe series are most extensively developed from the gneiss, although it has given rise to some areas of Porters soil. The schist of this formation gives rise to soils of the Chandler and Talladega series.

Other formations occurring in the mountain section of the county are the Blowing Rock gneiss, a more or less coarse, porphyritic gneiss, which occurs just west of the area of Carolina gneiss. Soils of both the Ashe and Porters series are developed from this formation. Small areas of the Cranberry granite occur within the area of Carolina gneiss and in the vicinity of Anthony Creek and Gragg Fork. Soils of the Porters series came largely from this formation. The Unicoi formation, which occurs on Grandfather Mountain and to the southeast, consists of white sandstone, quartzite, shale, and conglomerate. The sandstone contains a small amount of feldspar and weathers chiefly into soils of the Ashe series, which differ very little from those coming from the lighter colored granite and gneiss rocks. The Ashe and Porters soils also come from small areas of Beech granite and Flattop schist in the northern part of the county, while the Linville metadiabase, occurring chiefly southeast of Grandfather Mountain, gives rise largely to Porters soils.

The alluvial soils of the county occur most extensively along the Yadkin and Johns Rivers and Mulberry and Lower Creeks. They include both first-bottom and terrace soils, and are derived principally from reworked Appalachian material, but partly from Piedmont material.

The Cecil series is characterized by gray to red surface soils, underlain by red clay subsoils. The topography varies from undulating to rolling. The Cecil soils are derived principally from granite and gneiss, and occur exclusively in the Piedmont province. The soils of this series in Caldwell County are the sandy loam and clay loam, the latter with a steep phase.

The Louisa soils are derived from micaceous gneiss and schist, and are characterized by gray to brown surface soils and red subsoils. They contain a high percentage of mica and have a greasy feel. The topography varies from undulating to rolling. The only soils of

the Louisa series occurring in this county are the loam and its steep phase.

The Porters is the most extensively developed series of soils in that part of the Appalachian province lying within North Carolina. It is characterized by brown to reddish-brown surface soils which are underlain by friable, clay subsoils, red or dull red in color. On slopes and in coves, where there is a marked accumulation of vegetable matter, the soils may be almost black. The Porters soils are derived from the weathering of igneous and metamorphic rocks, coming most extensively from granite and gneiss. The topography is generally steep and mountainous, but the porous nature of the subsoil prevents undue erosion. The Porters sandy loam, loam, and clay loam occur in Caldwell County.

The soils of the Ashe series differ from the Porters soils chiefly in color. They are derived from the same kinds of rocks, but the rocks are lighter colored and somewhat lower in iron-bearing minerals. The Ashe series is characterized by grayish or brownish surface soils and rather porous, yellow or light yellow clay or sandy clay subsoils. The topography is generally steep and mountainous. The Ashe sandy loam and loam are found in Caldwell County.

The members of the Talladega series are characterized by gray to brownish surface soils and red, micaceous, friable subsoils which are greasy to the touch. They are derived largely from mica schists and are somewhat less productive than the soils of the Porters series. The topography is generally rough and mountainous. The Talladega series is not extensively developed in Caldwell County. The loam is the only representative of the series mapped.

The Chandler soils correspond to the Talladega except in color. They are derived from mica schist rocks occurring in the Appalachian Mountains. The soil is gray in color and the subsoil yellow. The latter is high in mica and has a greasy feel. The only type of this series found in the county is the Chandler loam.

The soils of the Congaree series are developed in the bottom lands of the streams which pass through the Piedmont and Appalachian provinces. They are characterized by brown to dark-brown soils and brown or yellowish-brown subsoils. There is generally some mica in both soil and subsoil. They consist of materials washed from upland soils of the Piedmont and Appalachian provinces and reworked and deposited by streams. The fine sandy loam and loam members of the Congaree series occur in this county.

The soils of the Altavista series occur on terraces or second bottoms. They are characterized by brown or dark-brown surface soils and subsoils which are yellow in color or yellow slightly mottled with gray or drab. The Altavista soils are composed of reworked Pied-

mont and Appalachian material. Only the loam occurs in Caldwell County.

Rough stony land includes steep slopes which have an abundance of solid rock outcrops and are consequently nonagricultural.

In following pages of this report the various soils of Caldwell County are described in detail and their relation to agriculture discussed. The distribution of the soils is shown on the accompanying map, and the table below gives the name and the actual and relative extent of each:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Porters loam.....	114,240	34.9	Porters sandy loam.....	5,120	1.6
Ashe loam.....	64,192	19.6	Ashe sandy loam.....	3,712	1.1
Cecil clay loam.....	51,200	15.9	Congaree loam.....	3,392	1.0
Steep phase.....	832		Porters clay loam.....	2,496	0.8
Louisa loam.....	25,280	8.9	Altavista loam.....	1,920	0.6
Steep phase.....	3,904		Chandler loam.....	640	0.2
Cecil sandy loam.....	26,240	8.0	Talladega loam.....	448	0.1
Congaree fine sandy loam.....	12,608	3.8	Total.....	327,680
Rough stony land.....	11,456	3.5			

CECIL SANDY LOAM.

The surface soil of the Cecil sandy loam is typically a gray or brownish sandy loam, varying from 6 to 15 inches in depth. Occasionally where the soil contains some washed-in material the color is reddish. Immediately below the sandy surface layer the subsoil for 2 or 3 inches is frequently a yellowish-red sandy loam or sandy clay, passing into the compact, though fairly friable, red clay. As mapped in Caldwell County the Cecil sandy loam contains some small areas of Cecil clay loam and loam, and occasionally near the heads of small streams small patches of Appling sandy loam. The latter areas differ from the typical Cecil sandy loam in having a yellowish-red or mottled yellow and red subsoil. They would be mapped separately if the areas were large enough to be shown on a map of the scale used. Southwest of Patterson there occur areas of Cecil sandy loam which include small spots of a sandy loam soil underlain by a whitish sandy clay subsoil.

The Cecil sandy loam is an extensive type in the Piedmont portion of the county. It occurs in large areas in the southern and south-eastern parts. It is typically developed near Whitnel, to the north of Lenoir, around Granite Falls, and also between Grays Chapel and Dudley Shoals. The type is intricately associated with the Cecil clay loam in the south-central part of the county.

The surface features of this type vary from undulating to rolling. It occupies interstream areas and has an undulating to gently rolling topography which becomes rolling, and in some places broken, as the soil extends down the slopes. Owing to the high position and loose structure of the soil, and also to its topography, it has excellent surface drainage. The surface soil is sufficiently open and porous to allow free passage of rainwater, while the open, friable sub-soil readily stores up moisture for crops.

The Cecil sandy loam is an important soil. About 40 per cent of the type is cultivated. The uncultivated areas are generally forested with red oak, white oak, black oak, black pine, and yellow pine. The most extensively grown crops are corn, soy beans, cowpeas, sweet potatoes, and Irish potatoes. This is considered a good fruit soil, and apple and peach trees are found on practically every farm. More tobacco and cotton are probably grown than on any other soil in the county, although the acreage of these crops even on this type is small. The yield of corn ranges from 10 to 30 bushels per acre. Soy beans and cowpeas yield slightly less than on the Cecil clay loam. Irish potatoes average about 65 bushels per acre, sweet potatoes about 100 bushels, cotton one-third to one-half bale, and tobacco about 700 pounds. Some oats are grown on the type. Live-stock raising is carried on to a limited extent.

The Cecil sandy loam is handled with comparatively light implements. It is not generally plowed in the fall unless there is stubble to turn under. Acid phosphate and occasionally cottonseed meal are the principal fertilizers used. When acid phosphate is applied it is usually at the rate of 150 or 200 pounds per acre. A mixture of equal parts of acid phosphate and cottonseed meal is sometimes applied to potatoes and truck crops, generally at the rate of 150 or 200 pounds per acre.

Land of the Cecil sandy loam sells at \$15 to \$75 an acre, according to the location and improvements. The average selling price is about \$40 an acre.

This soil can be built up by adding large amounts of organic matter. Legumes and other cover crops should be plowed under, while applications of stable manure would increase the yields materially.

CECIL CLAY LOAM.

The Cecil clay loam is universally known as the "red-clay" land of the county. The surface soil consists of a red or reddish-brown clay loam or heavy sandy clay loam, ranging in depth from 4 to 8 inches. Frequently the surface 2 or 3 inches may be a heavy, reddish-brown, or gray sandy loam, which passes abruptly into a red, heavy clay loam. In a few places the surface soil is a brown loam or clay

loam, locally called "push land." The subsoil is a red, compact, heavy, fairly friable clay, usually extending to a depth of several feet. Locally the subsoil may have a reddish-yellow color, such a variation occurring near Piney Grove.

Included with this type are a few patches of a dark-red or reddish-brown clay loam, underlain by a deep-red, smooth, friable clay. If this soil occurred in sufficiently large areas, it would be classed as Davidson clay loam. The material is practically free from the quartz sand that is a characteristic of the subsoil of the Cecil clay loam. One patch of this Davidson soil occurs to the south of Kings Creek, another in the extreme southeastern corner of the county, and a third immediately east of Rocky Mountain Church.

The Cecil clay loam is distributed throughout the Piedmont section of the county and extends in narrow strips bordering the valleys into the intermountain areas. It is well developed around Lenoir and Gamewell, and throughout that general region.

The surface varies from gently rolling to strongly rolling. Most of the type occupies a favorable position for agriculture. The natural surface drainage is good, but the internal drainage is hindered somewhat by the rather compact structure of the subsoil. Terracing is necessary on some of the slopes to prevent washing.

The Cecil clay loam is one of the strongest soils in the county, and it is probably the most extensively farmed. About 50 per cent of the type is under cultivation, the remainder being forested with white oak, Spanish oak, black oak, old-field pine, yellow pine, and in the mountains, white pine.

Wheat, corn, soy beans, and cowpeas are the most important crops grown on this soil. The yields of wheat range from 8 to 20 bushels per acre; of corn, from 10 to 30 bushels; and of soy beans, from 8 to 10 bushels. Cowpeas give excellent returns. Oats and rye are also grown, while potatoes and garden vegetables are produced for home consumption. Some cotton is grown in the southeastern part of the county.

This land ranges in price from \$15 to \$100 an acre, depending upon the location, state of cultivation, and general farm improvements.

Most of the Cecil clay loam is in a rather low state of cultivation, but it is a soil which can be easily improved and made to produce large yields of small grains, corn, and grass. Deeper plowing and the incorporation of green-manure crops, such as soy beans, cowpeas, and clovers, would add the necessary organic matter to the soil and at the same time supply needed nitrogen. The application of barnyard manure is also recommended for this soil. When organic material has been incorporated, the soil thoroughly plowed and pul-

verized, and a liberal amount of lime applied, the addition of phosphoric acid will give splendid results.

Cecil clay loam, steep phase.—The steep phase is separated from the typical Cecil clay loam because of its rough topography and steepness of slope. Its surface is so steep and broken that cultivation can only be carried on with considerable difficulty. Areas of this soil occur along Gunpowder Creek and the Catawba River. It is best suited for use as pasture or forest land. Owing to the steepness of the slopes the soil, when denuded of its vegetation, is subject to serious erosion.

LOUISA LOAM.

The surface soil of the Louisa loam, as it occurs in Caldwell County, is a brown or grayish-brown loam. Its color varies from grayish to reddish, and its texture from a loam to a heavy fine sandy loam and in small washed spots to a clay loam. In all places the soil contains more or less gravel and the more gravelly areas are indicated on the map by symbol. The depth of the surface soil varies from 8 to 12 inches. It is underlain by a rather compact, brittle, dull-red clay, which continues as a rule to a depth of 3 feet or more, although the red crystalline schist, from which the soil is derived, is occasionally encountered within the 3-foot section, at depths below 2 feet. There is a considerable amount of finely divided mica, giving the subsoil a greasy feel. The rock from which this soil is derived is a reddish or purplish, schistose rock which frequently contains, especially when the soil is closely associated with the Cecil sandy loam, numerous small grains of quartz. In the vicinity of Hudson the gravel content of the type is very low.

The Louisa loam occurs rather extensively in the southeastern part of the county below the Brushy Mountains. It is developed in a broad, almost unbroken belt extending from Bald Knob southwest through Sawmill to the county line. Another large area lies along the boundary between Caldwell and Alexander Counties. The topography of the type varies from undulating to rolling, with rather steep slopes near most of the streams. Drainage is well established.

Probably 35 or 40 per cent of the type is cultivated. The forest growth on the uncultivated areas is about the same as on the Cecil soils, except that there is probably more oak and less pine than on the latter types. Cedar is found in a number of places. Corn is the most important crop on the type, yielding from 8 to 40 bushels per acre. Other crops are wheat, oats, rye, Irish potatoes, sweet potatoes, cotton, and tobacco. Soy beans or cowpeas are generally grown with the corn or as an important step in the rotation. Yields of all crops probably average a little higher than on the Cecil sandy

loam. Live-stock raising is carried on mainly for home use or for sale on the local markets. The Louisa loam is a good fruit soil, and apple and peach trees are found on every farm. Fruits, especially peaches, do well on this soil, but the life of the orchards is comparatively short.

This type is handled in a similar manner to the Cecil soils, and the same methods of fertilizing are practiced. The selling price of the land is the same as that of the Cecil sandy loam, but much of it is not so favorably located with respect to markets and transportation facilities.

Farming on this soil may be made more profitable by more thorough cultivation, the more extensive growing of soil-building crops, and by terracing the steeper slopes.

Louisa loam, steep phase.—The steep phase of the Louisa loam differs from the typical soil only in its hillier topography and in the fact that the gravel content is generally a little higher in the mountain regions than in the Piedmont. This phase is not very extensive. It has the same crop adaptation and gives about the same returns as the typical Louisa loam. The average selling price of the land is lower, however, on account of the rougher topography.

PORTERS SANDY LOAM.

The Porters sandy loam is a grayish-brown or yellowish-brown sandy loam or loamy sand, underlain at depths varying from 6 to 15 inches by a reddish, orange, or dull-red, friable sandy clay. The type generally contains some gravel and stone fragments.

This soil occurs in comparatively small areas scattered throughout the northeastern mountain section of the county, near the headwaters of King Creek. It generally occupies the tops of ridges or gaps. The areas are generally rolling, and both the surface run-off and underdrainage are good.

The Porters sandy loam is not an extensive type in Caldwell County, and it is not of very great importance agriculturally. Only about 5 per cent of it is cultivated. Practically the same crops are grown as on the Porters loam, but the yields are not so high. The forest growth is characterized by fewer hickory, birch, and spruce trees and by a greater amount of rhododendron and laurel than is characteristic of the Porters loam.

The Porters sandy loam is handled in a similar manner to the loam. The application of fertilizers is more necessary, however, than on the loam.

The selling price of this land varies from \$2 to \$25 an acre. It might bring higher prices if it were more accessible to markets and transportation facilities.

PORTERS LOAM.

The Porters loam consists of a brown or dark-brown, friable loam, 6 to 12 inches in depth, underlain by a brownish-red or red, friable clay loam or clay. Some variations from the typical Porters loam occur in Caldwell County. Where the type is mapped in elevated coves near Grandfather Mountain and on some of the rather steep northern and eastern slopes northeast of Draco the surface soil is nearly black, owing to a large accumulation of decayed vegetable matter. The subsoil of the areas is characteristically brownish-red in color and very friable. The Porters loam as mapped includes areas of Porters clay loam and stony loam too small to map and a number of very small areas of Talladega loam. Some small areas of Ashe loam are also included in places.

The Porters loam is the most extensive soil type mapped in Caldwell County. It is typically developed in the northern and central-northern portions. The type occurs almost exclusively on most of the lower mountains and extends well up into the higher mountains, although the higher elevations are generally occupied by soils of the Ashe series. The topography varies from rolling on some of the lower slopes, through very steep mountain sides, to undulating on the tops of some of the mountains. Both the surface drainage and underdrainage are well established. The friable nature of the subsoil allows the rainwater to soak into the ground. This prevents excessive erosion and permits the cultivation and grazing of some very steep slopes.

The Porters loam is an important farming type, although only about 5 per cent of it is cultivated. The fields are generally small, occupying the more accessible lower slopes and frequently the nearly level tops of mountains. The tree growth consists largely of chestnut, chestnut oak, white oak, red oak, hickory, poplar, yellow pine, and white pine. Spruce and mountain birch are common on northern slopes and in elevated coves. Rhododendron and laurel are characteristic of the type.

Corn is by far the most important crop grown, giving an average yield of nearly 25 bushels per acre. Other crops grown are wheat, oats, rye, buckwheat, and Irish potatoes. Most of the farmers grow enough cabbage, pumpkins, and turnips for home use, and some have these products for sale. Pumpkins and turnips are frequently used for cow feed.

Some cattle are grazed on the Porters loam and a small number are frequently fed through the winter. A small number of hogs and horses are raised.

The Porters loam is an excellent fruit soil. Apples, peaches, and bunch grapes are grown to some extent. Apples grown in the Duck

Creek section are said to have an especially fine flavor. Orchardring could be made a very profitable industry.

This soil is generally handled with one-horse cultivators. The plowing is shallow, and much of it is done with hillside plows. Some fields are so steep that the cultivation has to be done by hand. The crops are generally brought in from the fields on sleds. Plowing is done in the spring, just before planting time. Practically no fertilizer is used on this type. Where the surface is not too steep excellent pastures can be had on this soil.

The selling price of land of the Porters loam varies from as little as \$2 to a maximum of about \$65 an acre, according to the location and improvements. The lower-priced land is inaccessible and unsuited to cultivation.

PORTERS CLAY LOAM.

The Porters clay loam consists of a red or reddish-brown clay loam, 3 to 6 inches in depth, passing into a red or dark-red clay which is sometimes friable but in general somewhat heavier than the subsoil of the Porters loam. In some areas there is a layer of brown loam 1 or 2 inches thick over the clay loam soil.

The Porters clay loam occurs mainly on eroded slopes or divides, but to some extent on small nearly flat areas scattered throughout the mountainous part of the county. The largest areas are mapped near Waters and east of Colletsville, on rather low mountains. The surface drainage is adequate, but the underdrainage is sometimes deficient.

About one-third of the type is cultivated. The same crops are grown as on the Cecil clay loam, and the yields obtained are about the same as on the latter type. The soil is handled in the same manner as the Cecil clay loam, except that it probably receives less fertilizer. The uncultivated areas are largely forested with oak and pine, the latter being most abundant in the lower lying areas.

Land of the Porters clay loam ranges in price from \$10 to \$50 an acre, depending mainly on the location and improvements.

The methods suggested for improving the Cecil clay loam may be applied in the case of the Porters clay loam with equally good results.

ASHE SANDY LOAM.

The Ashe sandy loam consists of a light-gray or yellowish-gray or brownish sandy loam underlain by a yellow, friable clay. The subsoil generally contains some gritty material and occasionally a small proportion of mica. As mapped in this survey the type contains some small stony and gravelly areas.

This type lies chiefly on the tops of ridges and mountains in the northwestern end of the county, along the Avery County and Burke

County lines. Smaller areas occur along King Creek. The surface of the type is generally rather rough, and the drainage is everywhere thorough.

The Ashe sandy loam is not an important soil type in Caldwell County. Only about 5 per cent of it is cultivated. Corn, oats, and truck crops are grown most extensively. Oats do especially well. The average price of the land is about \$8 an acre.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Ashe sandy loam:

Mechanical analyses of Ashe sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
234915.....	Soil.....	6.7	16.9	7.6	24.6	11.5	18.5	14.1
234916.....	Subsoil.....	2.4	10.9	6.8	25.6	11.1	19.5	23.5

ASHE LOAM.

The Ashe loam consists of a brown or yellowish-brown, friable loam, 6 to 10 inches deep, underlain by a friable, rather gritty clay loam or clay, which ranges in color from yellow to brownish-yellow or sometimes rather light grayish yellow.

At elevations above 3,500 feet, especially on Grandfather Mountain and in places around Kelsey, the surface soil is much darker in color than over the rest of the type. The immediate surface layer is nearly black, owing to the accumulation of organic matter, and the subsoil is frequently a light-yellow or dark brownish yellow, friable clay loam or clay. The accumulation of organic matter which causes the darker colored surface soil in this instance, as in the case of the Porters loam, is probably due to the retardation of oxidation by the moisture from slowly melting snow during the winter months, which at the same time gradually carries leaf and vegetable mold into the soil. The areas of darker colored surface soil usually occur on north slopes and on areas which are so heavily forested that the melting of the snow is delayed. Small areas of Ashe sandy loam and Porters loam are included with the type as mapped.

The Ashe loam is a typical mountain soil. It is one of the most extensive types in the county, and is well developed throughout the northwestern part, in the mountain region. Large areas occur along the Watauga County line and southward to Globe. The type is not encountered in the Brushy Mountains.

The Ashe loam usually occurs at higher elevations than the Porters loam, and frequently the lower slopes of the mountains will be occupied by the Porters soil which grades on the higher slopes and

knobs into the Ashe loam. The latter type has a typically mountainous surface, consisting of steep slopes, high ridges, and knobs. Frequently the tops of the mountains or ridges are sufficiently smooth to be cultivable, but the slopes are generally too steep for profitable farming. In the rougher areas there have been frequent landslides, leaving the yellowish subsoil or underlying rock exposed. The Ashe loam is everywhere exceptionally well drained. The native forest growth on this soil consists principally of chestnut, chestnut and other oaks, poplar, hickory, spruce, rhododendron, and laurel. There are some balsam trees in the areas on Grandfather Mountain.

Very little of this soil is cultivated. The most important crops grown are corn, wheat, buckwheat, and apples. The grass growth is of good quality and affords excellent pasturage for cattle and sheep. Crop yields compare favorably with those obtained on the Porters loam. The type is admirably suited to the production of apples, and in some places to peach production.

The selling price of this land varies from a few dollars to about \$100 an acre, depending upon the location and topography.

The Ashe loam in Alleghany and Ashe Counties is used extensively for pasture land, and there appears to be no reason why the areas in Caldwell County can not be advantageously used for the same purpose. Apple growing is highly recommended for this type. The rougher and more inaccessible areas should, and will in all probability, remain in forest.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Ashe loam:

Mechanical analyses of Ashe loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
234905.....	Soil.....	2.3	12.8	7.1	28.4	14.3	23.2	11.3
234906.....	Subsoil.....	4.5	11.8	5.7	23.7	14.0	27.1	13.0

TALLADEGA LOAM.

The surface soil of the Talladega loam consists of a brown to reddish-brown, mellow, friable loam to silty loam, from 5 to 10 inches deep. The subsoil is a red, yellowish-red, or pink, friable clay or silty clay loam, containing a sufficient quantity of small mica fragments to have a greasy feel. The mica schist from which this soil is derived is frequently encountered 2 to 3 feet below the surface.

This is an inextensive type occurring principally in the central-northern part of the county along the Lenoir and Blowing Rock turnpike. It is developed on the crest of the high ridges and moun-

tains, and its surface is rolling to steep and broken. The natural drainage is excellent.

Very little of this type is cultivated. The yields of farm crops are not quite as good as those obtained upon the associated soils. Apples appear to do well, and there seems to be no reason why their production could not be extended profitably.

CHANDLER LOAM.

The soil of the Chandler loam consists of a gray or yellowish-gray, friable, mellow loam or silty loam, 6 to 10 inches deep. It is underlain by a yellow or yellowish-gray to almost white, friable clay loam or clay, which contains enough mica flakes to give it a greasy feel. Mica schist rock, from which this type is derived, is encountered at depths varying from 2 to 4 feet below the surface. The type differs essentially from the Talladega loam in the color of the soil and subsoil.

This is an unimportant type. The largest area occurs in the northern part of the county along the Wilkes County line. It is developed on high ridges and mountains, has a rough mountain topography, and is well drained. Practically none of it is under cultivation. The crop adaptation of the soil is not materially different from that of the Talladega loam. Pasture grasses do not make as luxuriant a growth as on the Ashe loam.

ALTAVISTA LOAM.

The surface soil of the Altavista loam is a gray to brown loam or silty loam, 6 to 10 inches deep, underlain by a yellow or brownish-yellow, compact but friable clay or clay loam, which in the flatter areas is frequently mottled with gray. Adjacent to the red clay uplands the surface soil is frequently a reddish-brown loam, while the subsoil here may be a reddish-yellow, compact clay. There is usually a noticeable amount of finely divided mica scales in the subsoil.

In the vicinity of Globe, and in a few other localities, the type as mapped consists of a dark-brown to black silt loam, underlain by a brown or yellowish-brown silt loam or silty clay loam which carries a considerable quantity of small mica flakes. This soil is quite similar to the Toxaway silt loam, but owing to its small extent it is included with the Altavista loam in mapping.

The Altavista loam occurs along the Yadkin and Johns Rivers and Buffalo and Wilson Creeks. Some of the largest areas are found in the vicinity of Globe and along the bottoms to the east of Legerwood, while a few small areas are mapped along some of the other large creeks. The type occupies low second bottoms or terraces and frequently extends a short distance up the slope from the terrace to

the upland. In most places it is fairly well drained, as it lies above the normal overflow level of the streams and frequently has a gradual slope toward the channel. It differs from the Congaree soils in occupying slightly higher elevations and in being much less subject to overflow.

The Altavista loam is used principally for the production of corn, wheat, and hay. It is an excellent corn soil, and yields of 20 to 50 bushels per acre are not uncommon. Wheat is grown on the higher-lying areas, usually bordering the uplands. Practically all of the type is under cultivation. It is farmed in about the same way as the Congaree soils. It is naturally strong and durable, and when properly handled is capable of producing large yields of corn and small grain indefinitely.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Altavista loam:

Mechanical analyses of Altavista loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
234907.....	Soil.....	2.6	6.6	3.8	20.9	19.9	30.2	15.8
234908.....	Subsoil.....	3.5	4.6	2.5	20.5	19.2	35.8	13.7

CONGAREE FINE SANDY LOAM.

The Congaree fine sandy loam as mapped in Caldwell County shows several variations. Typically the surface soil to a depth of 10 to 18 inches is a brown or dark-brown fine sandy loam. This is underlain by a yellowish-brown fine sandy clay, clay loam, or silt loam. The subsoil is generally micaceous, and occasionally mottled with brown and gray in the lower part of the 3-foot section. The surface soil varies from a very fine sandy loam to a fine sand, the coarser areas representing areas of typical Congaree fine sandy loam or silt loam on which gray or white sand was deposited by the flood of 1916. These areas were included with the Congaree fine sandy loam because they are rapidly being built into good soil and because of their general occurrence in such narrow strips that they can not be shown separately on the soil map. In places patches of Congaree fine sandy loam occur in which the texture is a fine sandy loam to a depth of 3 feet or more. During the flood of 1916 much of the bottom soil was badly damaged or washed away. In places narrow strips of sand and gravel were deposited. These are too small in extent to show separately on the map.

The Congaree fine sandy loam is a first-bottom soil occurring in narrow strips along nearly all the streams of the county. Its sur-

face is generally level, but in some places, especially along the larger streams, the areas have been somewhat cut up by the forming of temporary channels during periods of overflow. The soil is frequently inundated, especially following heavy rainfall, but the drainage is good.

The total area of Congaree fine sandy loam in Caldwell County is not very large, but it is an important soil type. The greater part of it is cultivated. It is an exceptionally good corn soil, the average yield being about 25 bushels per acre. Soy beans are grown rather extensively, usually in the cornfields. The ordinary yield is 16 bushels per acre. Wheat, potatoes, watermelons, sorghum, and truck crops are also grown on this type.

In growing corn the Congaree fine sandy loam is not generally fertilized, but wheat land usually receives an acreage application of 150 to 200 pounds of 16 per cent acid phosphate, and a mixture of equal proportions of acid phosphate and cottonseed meal is applied to potatoes and truck crops. This land brings from \$25 to \$125 an acre, depending upon the location and upon the size of the areas.

CONGAREE LOAM.

The surface soil of the Congaree loam is a brown loam or silty to very fine sandy loam, varying in depth from 8 to 15 inches. This is underlain by a yellowish-brown, micaceous clay loam or friable clay or silt loam. The subsoil is sometimes slightly mottled with gray or drab and rusty-brown. The type as mapped in Caldwell County includes some narrow strips of Congaree fine sandy loam and of mixed colluvial and alluvial material, too small to map separately. The former generally occur adjacent to the stream; the latter next the upland.

The Congaree loam occurs along most of the streams of the county, but it is not very extensive. A large area is mapped along Lower Creek. The type occupies first-bottom land subject to overflow at stages of high water. Where it is associated with the Congaree fine sandy loam the latter type usually occupies a position adjacent to the stream, and the loam a position nearer the upland. The loam has a flat surface and is not so well drained as the fine sandy loam, and artificial drainage is sometimes necessary before the type can be cultivated.

The Congaree loam is a productive soil, and the greater part of it is either cultivated or used for hay production. Frequently, in places where the slopes occupied by the upland soils are too steep to be conveniently cultivated, strips of the Congaree loam, together with narrow strips of colluvial soil between it and the upland, are the only areas cultivated. Corn is the most important crop. It yields 25 to 50 bushels per acre. Bearded wheat is grown to some

extent, giving an average yield of about 10 bushels per acre. Mixed hay yields from three-fourths ton to $1\frac{1}{2}$ tons per acre. Some sorghum is grown, and vegetables are produced for home use.

The Congaree loam is seldom fertilized, owing to its natural productiveness. It is handled much like the fine sandy loam. Some farmers apply 1 ton of lime per acre every three or four years.

This land sells at prices ranging from \$25 to \$125 an acre. The price is largely dependent on the drainage conditions.

ROUGH STONY LAND.

Areas mapped as Rough stony land in Caldwell County include steep mountain slopes or rough broken areas so stony in character or having so many large outcrops of rocks as to be unsuited for agricultural purposes. Part of the type is nothing more than bare rock walls. The type is associated principally with the Porters and Ashe soils, and the outcropping rocks are the same as the bedrock from which those soils are derived.

The Rough stony land occurs in the northwestern and northern parts of the county, chiefly along Wilson Creek, on Sand Mountain, and along the Yadkin River, with scattered areas south of Fairview. In places the type supports a growth of oak, chestnut, and spruce. None of it can be cultivated, and only a small percentage can be used for grazing purposes.

SUMMARY.

Caldwell County is situated in the northwestern part of North Carolina, one county lying between it and Tennessee on the west and two counties between it and Virginia on the north. The northern two-thirds of the county is mountainous, while the southern third consists of undulating to rolling Piedmont country. The range in elevation is from about 900 feet above sea level, at the point where the Little River enters the Catawba, to 5,964 feet on the summit of Grandfather Mountain.

The regional drainage of the county is excellent. Streams of all sizes reach to all parts of the county, and only the flat bottom lands along streams are inadequately drained.

The population of the county consists largely of native white persons. In 1910 the total population was 17,215, 83.7 per cent of which was classed as rural. The most important towns are Lenoir, the county seat; Granite Falls, Rhodhiss, Hudson, Mortimer, Collettsville, and Patterson.

Two railroads enter the county. A few of the public roads are good graded highways, but the majority of the roads are only fair, becoming very poor during the winter months.

The climate of Caldwell County is favorable for agricultural pursuits. The rainfall is adequate and uniform, and the winter temperatures are mild. The growing season averages six months in length.

The early settlements in Caldwell County were made along the streams, especially the Yadkin River. Later the uplands were farmed, and at present the agricultural population is well scattered over the county with the exception of some of the rougher mountain districts.

General farming is the prevailing type of agriculture, with corn as the principal crop. Live-stock raising is not extensively engaged in, although nearly every farmer raises enough cattle and hogs to supply meat products for home use, and some of the farmers have stock for sale. Cattle grazing and fruit growing could well be extended in the mountainous part of the county.

The farmers recognize that wheat is better adapted to the heavier textured soils than to the coarser types, while oats and potatoes do best on the lighter soils. Corn does best on bottom-land areas, but is grown indiscriminately on all the soils of the county.

Farming methods and equipment vary throughout the county according to the character and steepness of the land and the progressiveness of the farmer. In general the farm equipment is not of high grade.

Acid phosphate is the most generally used fertilizer, although cottonseed meal is used on some crops. A common fertilizer preparation consists of a mixture of acid phosphate and cottonseed meal in equal parts.

About 75 per cent of the farms of the county are operated by the owners. The proportion has remained practically constant since 1880.

Farm land sells for an average of about \$40 an acre. Some areas of bottom land have brought as much as \$125 an acre. The less desirable rough areas have a very low value.

The soils of Caldwell County occur in three provinces, namely, the Piedmont Plateau, the Appalachian Mountains, and the River Flood Plains. The Piedmont soils are represented by the Cecil sandy loam and clay loam and the Louisa loam. These are good general-farming soils, capable of being built up to a high state of productiveness. The most extensive Appalachian soils are classed in the Porters and Ashe series. These include productive soils which, however, are not very extensively farmed on account of their generally rough and mountainous topography. The alluvial soils comprise only a small part of the county, but they are important on account of their productiveness and favorable position for farming. The greater part of their area is cultivated, and the crop yields are relatively high.

[PUBLIC RESOLUTION--No. 9.]

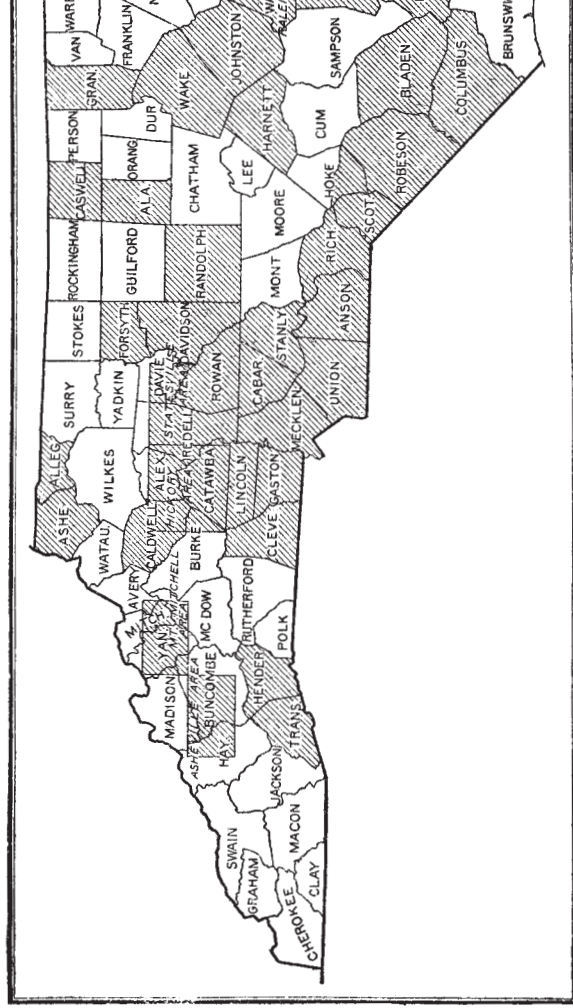
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture "

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, be amended by striking out all after the resolving clause and inserting in lieu thereof the following:

That there shall be printed ten thousand five hundred copies of the report on field operations of the Division of Soils, Department of Agriculture, of which one thousand five hundred copies shall be for the use of the Senate, three thousand copies for the use of the House of Representatives, and six thousand copies for the use of the Department of Agriculture: *Provided*, That in addition to the number of copies above provided for there shall be printed, as soon as the manuscript can be prepared, with the necessary maps and illustrations to accompany it, a report on each area surveyed, in the form of advance sheets, bound in paper covers, of which five hundred copies shall be for the use of each Senator from the State, two thousand copies for the use of each Representative for the Congressional district or districts in which the survey is made, and one thousand copies for the use of the Department of Agriculture.

Approved March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils.]

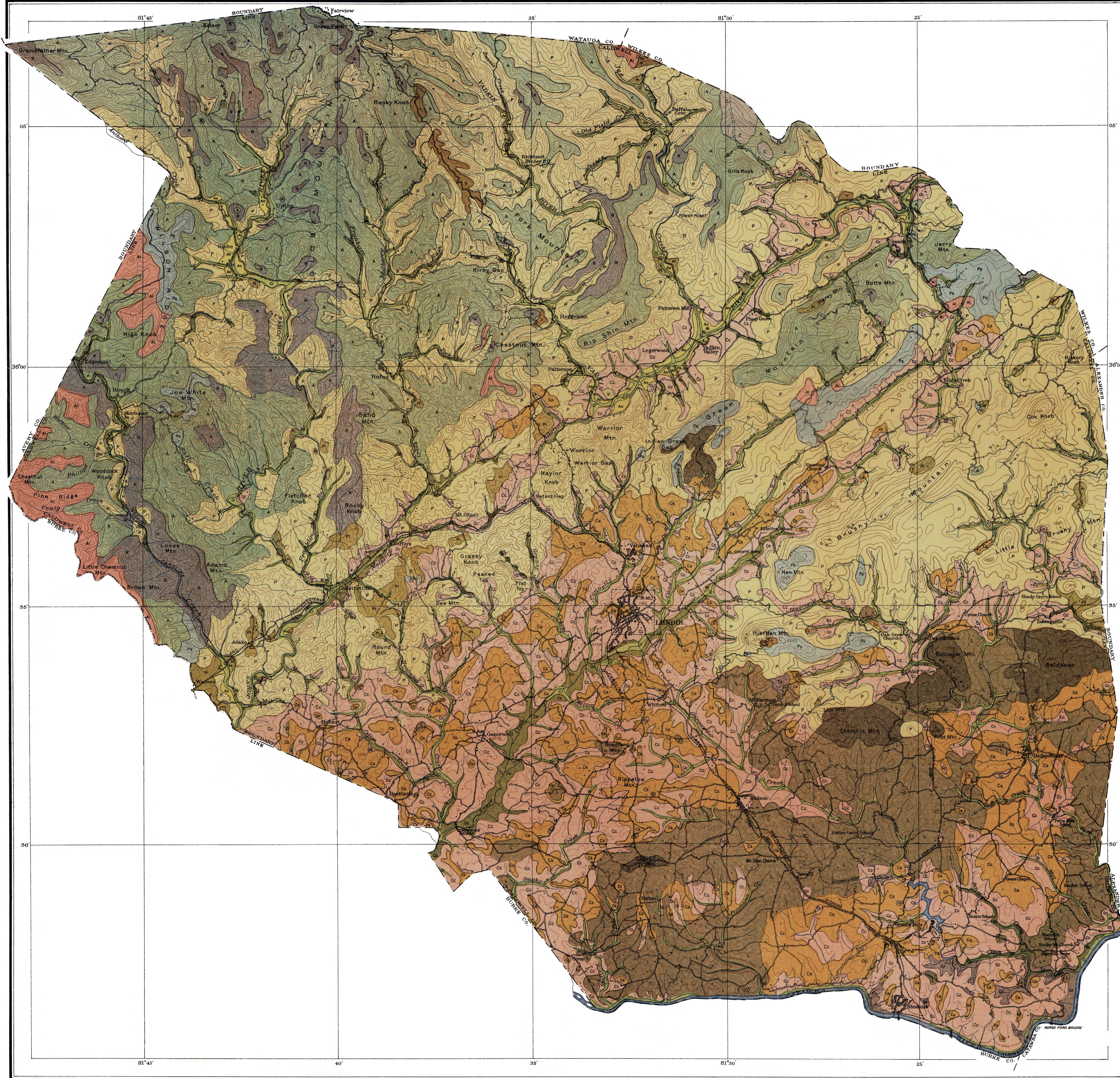


Areas surveyed in North Carolina.

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LEGEND	
Cecil sandy loam Cc	Ashe sandy loam Ai
Cecil clay loam Cc	Ashe loam A
Steep phase	Talladega loam T
Louisa loam L	Chandler loam C
Steep phase	Congaree fine sandy loam Ci
Porters sandy loam Ps	Congaree loam Co
Porters loam P	Altavista loam Ao
Porters clay loam Pi	Rough story land R

CONVENTIONAL SIGNS

CULTURE
(Printed in black)



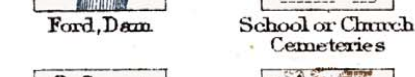
City or Village, Roads, Buildings, Wharves, Ferries, Breakwaters, Levees, Lighthouses, Piers



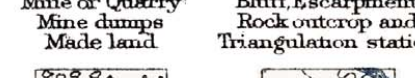
Secondary roads and trails, Bridges, Ferries, Ford Dam



Railroads, Steam and Electric, R.R. crossings, Tunnel, School or Church



Mine or Quarry, Mine dumps, Shale land



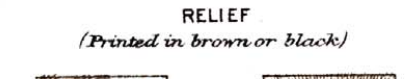
Steep and gravelly areas, Soil boundaries, U.S. township and section lines



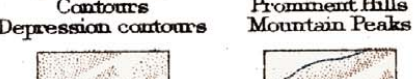
Relief, Depression contours, Prominent hills, Mountain peaks, Sand wash, and Sand dunes



Drainage, Streams, Lakes, Ponds, Intermittent lakes, Storage canals and Ditches, Flumes, Swamps, Salt marshes, Submerged marsh



Relief, Depression contours, Prominent hills, Mountain peaks, Sand wash, and Sand dunes



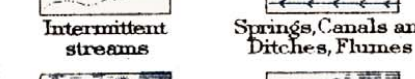
Drainage, Streams, Lakes, Ponds, Intermittent lakes, Storage canals and Ditches, Flumes, Swamps, Salt marshes, Submerged marsh



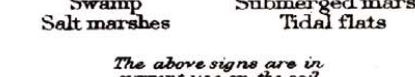
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Drainage, Streams, Lakes, Ponds, Intermittent lakes, Storage canals and Ditches, Flumes, Swamps, Salt marshes, Submerged marsh



Relief, Depression contours, Prominent hills, Mountain peaks, Sand wash, and Sand dunes



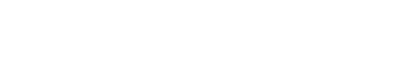
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